

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

AUGUST 8, 1949



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AVIATION PRODUCTS

Runway Strength Survey

CIA plans a detailed survey on airport runway strength, as a result of differences of opinion between runway engineers about pavement requirements for various loads. Current CIA runway strength standards have been under fire and characterized by some engineers as "too stringent beyond reasonable requirements for economy and safety."

Phillips Moss, CIA Airport Director, points out that standards are for pavements designed to take capacity equivalent of planes of the weight specified without excessive maintenance. He says that most criticism he has received has cited cases of occasional runs of relatively light pavement by large aircraft without any apparent damage, or runs where reconstruction shows that a special condition exists.

Moss sees a responsibility for large plane designers in accepting final loading gear and wheel tandem spacings, instead of single wheel plans, to reduce the thickness requirements by spreading the load. Another solution is the interplanar track loading gear. While pavements can be designed for any weight airplane, there is a practical limit to the strength of runways, which the airport owner can afford to provide.

Subsidy Problem

Senate Interstate & Foreign Commerce Committee may make its own survey and lay down its own service and pay rates for airlines.

The committee is now stymied on the issue of separating service and subsidy payments to carriers. Sen. E. B. Johnston (D., Calif.), chairman of the committee, favors legislation granting the Civil Aeronautics Board \$150,000 to make the study, and directing that the new system be put into effect July 1, 1958. CAB, however, has tentatively rejected the stipulation for an effective date. The Board wants only the \$300,000 to make the study.

Members of the House Appropriations Committee, on the other hand, are opposed to giving the Board additional funds, claiming that CAB ought to be able to set service rates for itself and meet with information it now has on hand.

Radio Operator Fight

CIO Transport Workers Union claims its fight against elimination of radio officers from crews on international flights.

NEWS SIDELIGHTS

Airlines Fight Back

The air transport industry is getting organized to see back at airlines that have been using administrative, news releases and appearances before congressional committees to turn public sentiment against the union.

R. D. White, president of the Baltimore & Ohio Railroad, as noted recently that the railroad carries 94 percent of the cost and makes no pay for it than the others do for carrying the remaining 6 percent. J. H. Parnell, vice president of the Air, of American Airlines, attacked the airline "economic form of competition" in testimony before the Senate Interstate and Foreign Commerce Committee.

The airline challenge states that the railroads are unbalanced and assert that government aid to air carriers has been greatly exaggerated by the rail. Moreover, the airlines have compiled statistics showing that railroad freight charges are lower than the cost of passenger operations which, with few exceptions, are conducted at a loss.

too high, but that this country might go along with a \$100 million loan with certain conditions, one of which included the signing of a commercial air agreement.

The Mexicans decided these were two ways things attached to the air loan deal and refused the U. S. proposition. Eastern Air Lines, British Airways and Western Air Lines have been offered for routes to Mexico but have been unable to achieve these because of breakdowns in past negotiations.

Closer Separation

Defense Secretary Louis Johnson said a commercial move is sometimes of the CAB, Army and Navy, pointing out that "separation of the separate services as separate departments should not impede the integration of the three departments."

The move came at the time that a joint study report was the last of a series of 48 studies under establishment of the Air Force as a separate department of the National Military Establishment (Associated Press, Aug. 1). The action and past Army Air Force adjustment regulations issued in a result of the order, for the first time now give the Air Force a legal basis for its operations independent to that of the two other departments.

Which Stalling Speed?

Part 3 of Civil Air Regulations sets an approval stalling speed for two-term part permits at 70 mph. Revised CAR division appears to set a single engine aircraft for conduct flight without approval, unless operational procedure for emergency operations is to the CAB for regulation.

As CAA deals with a manual of procedure for air carrier operating certificate for local areas, which limits the stalling speed to the lower figure of 50 mph. Then in effect it makes emergency in case of non-engine failure, the only kind of terms the single-engine planes are supposed to fly over anyway. It also makes exceptions in favor of older planes under other hypothetical conditions.

Result is a considerable confusion among the groups asking to operate, and a need for clarification of the CAA manual. One industry source reported last week that a preliminary study showed only one of the few, five plus single engine positive planes, the Beech Bonanza, would meet the 50 mph still requirement.

Latest maneuver is the sending of letters by CIO Secretary Treasurer James J. Casey to CAB Chairman Joseph J. O'Connor, Jr., in criticism of the Air Cautious Committee, and division appearing to set a single engine aircraft for conduct flight without approval, unless operational procedure for emergency operations is to the CAB for regulation.

According to the letters, Article 16 of the treaty makes it compulsory for all commercial aircraft to carry radio operators and a licensed operator on flights between American countries.

Casey charged that the Civil Aeronautics Administration was suspending licenses from its permitting order to keep radio officers. He asked Sawyer to take "direct action" to correct the situation.

Wary Mexicans

After repeated unsuccessful attempts to negotiate a bilateral air transport agreement with Mexico by the direct method, the U. S. usually tried the indirect approach—and failed again.

Mexico has been declining for a \$400 million loan to develop its oil industry. U. S. officials indicated \$400 million was



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AVIATION CALENDAR

Aug. 6-8-1989 West Coast spring class, Newport, Philadelphia, Aug. 6, Calif.

Aug. 7-14 General annual conference, New York airport, NYAC, August, New York, N.Y.

Aug. 22-23-ALC, nuclear device meet, Boeing plant, Seattle, Wash.

Aug. 21-26 American Institute of Electrical Engineers, Pacific general meeting, Flamingo Hotel, Las Vegas

Aug. 25-28 Flying French national convention, Fort Collins, Colo.

Aug. 29-Sept. 1-Americanist Air, annual meeting, Butler Hotel, N.Y.

Sept. 1-7 International conference of Engineers Association, Indianapolis, Waco-Park Hotel, Cleveland, Ohio

Sept. 13-14-1989 National Air Race, Cleveland, Ohio

Sept. 16-Annual speech plug and system conference, sponsored by Chongren Speech Plug Co., Hotel Snow, Toledo, Ohio

Sept. 21-10th Society of British Aircraft Constructors, flight display and exhibition, Farnborough Airfield, Hampshire, England

Sept. 21-22-Congress on maintenance of military aircraft, International Society of America, Sheraton Hotel, St. Louis

Sept. 18-20-International Northwest Area General Convention, Spokane, Wash.

Oct. 1-4-Toronto, national meeting, Society of Naval Architects, New York

Oct. 1-4-SAE national aerospace meeting and aircraft engineering display, Baltimore Hotel, Los Angeles

Oct. 3-4-American Air Mail Society exhibition and convention, Edgewater Beach Hotel, Chicago

Oct. 12-15-Air Reserve Association convention, Long Beach, Calif.

Oct. 13-24-Third annual San Francisco Air Fair, sponsored by Aeronautical Chamber of Commerce, San Francisco Airport

Oct. 19-Nov. 2-Aircraft convention, National Area of Airline Aviation Officials, New Orleans

Nov. 8-13-Seventh annual meeting, American Division and Manufacturers Association, Fort Belk Springs Hotel, Fort Belk, Ind.

Jan. 19-21, 1990-All American Air Meet, Phoenix, Arizona

PICTURE CREDITS

10 (above) Harrison, 18-19P, 16-17, 21-NRA, 21 (above) 21-16P, 21-16P

Levere THERMOCOUPLES FOR AIRCRAFT CYLINDER HEAD TEMPERATURES

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Base-Construction in accordance with

AN-541 Dwg.

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SPEC. AN-T-75.

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TQ-327
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TA-3649

1/16" base, stainless steel, brazed-in to concrete with AN-4276-1.

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CORPORATION OF AMERICA
WALLINGFORD 2, CONNECTICUT

AVIATION WEEK, August 5, 1989

NEWS DIGEST

DOMESTIC

Douglas Super DC3 New from Los Angeles to San Francisco in 1 hr 37 min, clipping 10 minutes off the scheduled flight time of the fastest non-jet transport in service.

American Aircraft Corp. board of directors including John A. Lewis, president; Edmund H. Williams, vice president; and S. J. Kaden, secretary-treasurer; Raymond E. Stenard was re-elected chairman of the board.

Raymond J. Ward, 72, assistant treasurer and controller of Carthage Wright Corp., died of a heart attack in the company's offices in Wood-Ridge, N.J.

TEMCO received an initial order from the Transportation Air Force for approximately \$10 million worth of C-47, PT-18 and AT-7 parts. Order means TEMCO's 1946 volume in military and transport aircraft parts will over the quarter million dollar mark.

National Airlines has proposed a "family plan" for its national air travel, to become effective next month. National would extend a 50 percent reduction for family members accompanying one full-time adult, from midnight Sunday to midnight Wednesday, on its routes between Hawaii and Miami, Tampa, Washington and New York.

Civil Aeronautics Board last week was holding a public hearing to determine the probable cause of the Seattle crash of an Air Transport Association, Inc. C-46.

National Mediation Board met last week with Air Line Pilots Assn. and National Pilots Assn. representatives to determine who can select a pilot to hold to select a collective bargaining agent for NAL cockpit personnel. NPA, formed by non-union pilots last year during National's drive, challenges ALPA's status in bargaining agent. ALPA has charged National with NPA members as its payroll exclusively after ALPA pilots returned to work.

Lombardi Airplane Corp. reorganization may hinge on a \$600,000 Reconstruction Finance Corp. loan applied for last week. First manufacturers at Lombardi last frequently behind. About 65 employees are working on military contracts and subcontractors from Boeing and Consolidated Vultee. Heavy postwar plant investment in expansion of larger instrument production left the company short of operating capital. Funding

show assets of \$315,273.63 and liabilities of \$612,303.48.

First Joint Airline, awarded by the system industry, General Aircraft Laboratory, Inc., and General University, included guests from Carthage Wright Corp., Fairchild Engine and Airplane Corp., General Aircraft Engineering Corp., and Republic Aviation Corp. Followings in good for study at the university and laboratory.

Howard Kuchner, 64, southern Ohio test pilot for Orville Wright, was found dead in Birmingham, Miss.

FINANCIAL

Republic Aviation Corp. reported net income after taxes of \$117,335 for the first month of 1989. Sales for the period totaled \$17,779,332 and backlog now stands at \$35,905,800. Republic is currently conducting a test flight program with the XF-41 jet interceptor.

Standard-Thomson Corp. showed a net profit of \$518,335, after charges and taxes, for the first year ended May 31, 1989. Profit is equal to \$1.02 per share, compared with a net profit of \$135,671, or 68 cents a share, in the preceding fiscal year. Consolidated sales for the first six months of 1989, were \$7,080,219, compared with \$3,024,696 for the previous fiscal year.

Robert Gray Co., Inc. showed a consolidated net income for the quarter ended June 30, 1989, of \$503,199 after taxes, equal to 40 cents per share on 1,778,850 shares of common stock. Consolidated income for the first six months of 1989, after taxes, was \$1,839,551, equal to 94 cents per share of common stock.

INTERNATIONAL

British invented a new engine, 140-ton freight hauler of the British class, which the manufacturer, Breda, Inc., Ltd., says will be in 14 months. Craft was ordered by British Overseas Airways Corp.

SAS carried 1865 passengers from New York to Europe in June, for a 99.6 percent load factor and a new record for the carrier. For the first six months of 1989, SAS carried 50,600 passengers to and from the United States.

Continental passenger service was resumed after a four-day interruption when commercial flights to and through the country were suspended by a revolutionary outbreak. TACA and Pan American Airways were affected.



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AVIATION WEEK, August 5, 1989



British Jet Transport Makes First Flight

Comet gives Britain wide edge over rest of the world in jet transport design.

By Robert McLann

When the world's first designed-for-the-purpose jet transport, the 36-passenger British de Havilland DH-106 Comet successfully completed its first test flight July 27, it opened a new era in commercial air transportation, and put the United States and the rest of the world at least three years behind technologically in this field.

Chief test pilot John Cunningham, at the controls of the prototype Comet during its 31-minute flight, leading a crew of four, took the four jet plane up to 18,000 ft and performed dozens of maneuvers to test its stability and control. Then he made a confident low-altitude "zoom" flight about 100 ft off the Hatfield, Hertfordshire, airport before coming in for an on-land.

These Van Miere-it will be about five years (late 1952 or early 1953) before production Comets will be ready for introduction in the British Overseas Airways Corp. trunk services. But it is not expected the Comet will be introduced on a London-New York mainline service initially, despite the prestige value of such a schedule. Development of the transport to make possible a slightly longer range than the 2500 miles now quoted must come first.

The prototype took the air less than three years from the decision to "go ahead" on the project taken by de Havilland on its own initiative in September, 1946. A remarkable example of the confidence of the test pilot and crew is the fact that the plane

has only 48 hours after having been rolled from the factory, in contrast to the weeks of ground testing common for such a large and complex project.

► **Ghost Turbines**—Outstanding attributes of the Comet are its close layout and facile utilization of the first de Havilland Ghost turbojet engines, which develop 5000 lb static thrust each. The new transport has a cleaner appearance than current U.S. jet bombers and obviously great efficiency has been paid serious thought and work, much to its more excellent flight efficiency. Cleanliness has been made of the British design method of metal-to-metal bonding, which not only permitted a smooth surface finish and work, much to its more excellent flight efficiency. Cleanliness has been made of the British design method of metal-to-metal bonding, which not only permitted a smooth surface finish and work, much to its more excellent flight efficiency.

The low wing monoplane wing has only moderate sweep of about 30 degrees, and at which it along the leading edge, indicating greater interest in stability

than in excessive in critical Mach number. Tail surfaces are not swept back.

► **Slow Landing Speed**—Careful attention was paid to landing characteristics of the Comet. Generous wing area reduced the loading to below that of current piston-engine U. S. type, built-in wing leading edge, automatic Handley-Page slots are used, three trailing edge flap pitch extend under the fuselage and outboard to such extent, and first sets of air brakes above and below the trailing edge all combine to give the Comet a landing speed of well under 100 mph. Despite these points, however, great care has been exercised in their fitting lightly in the closed position to ensure low drag for high cruising speed.

Fully retractable leading edge gear is used, the nose gear folding aft into the lower fuselage and the main gear units folding inward into the outer wing panel, where they are covered by large doors. The main gear is fitted with dual wheels but large, single wheels are used in the outermost main gear legs. These wheels carried a forward blower on the wing upper surface to accommodate their use with de Havilland plan control installation of four-wheel nose gear units, however, to permit operation of the Comet on airfield runways and to eliminate the wing blower. A retractable tail also mounted in the aft fuselage affords protection in nose-high landings.

► **Clean Installation**—Power plant installation is an exceptionally clean job in view of the fact that the wing profile is thin and the Ghost has a centrifugal compressor and a consequent overall diameter of 55 in. The engines are located well aft between the span. Air

intakes passed through ducts in the web. The engines are canted downward slightly, necessitating a lower fuselage forward and an upper being aft. The wing/fuselage structure is generally based due to the ductwork and, although the side area drag, access to stabilize the airflow over the engines. Underwing fueling inlets are provided. The Comet will carry most of its fuel in integral wing tanks.

► **Supercharge**—A simple procedure by use of ducted inlet blower to clear the jet exhaust wide. The small area of the vertical surface is causing considerable interference among engines.

The Havilland engineers point out that the high speed of the airplane plus the close-in location of the powerplants increases the asymmetric loads that must be accommodated. However, U. S. engineers evidently predict added fix-ups in the tail to insure delivery of adequate control during landing and takeoff it to be assured.

► **Pressure Problems**—The 40,000 ft. cruising altitude of the Comet necessitates other pressurization problems. A pressure differential of 8½ psi. had to be designed for, a figure substantially greater than any used by current U. S. transporters. The entire fuselage is pressurized, including freight and mail compartments, for simplicity's sake. Two test sections of the fuselage were given pressure tests in the altitude chamber at Hatfield and also subjected to underwing tests. Because of danger of air at operating altitude, air conditioning equipment is provided.

Although first flight test was accomplished considerably ahead of schedule, neither de Havilland nor the government expect the new transport to go into actual service far about their year. In addition to the small time table, the aircraft, considerable effort is planned in development of the power plant units with some emphasis on reduction in specific fuel consumption in order that the endurance of the airplane can be improved to meet better control requirements.



DE HAVILLAND GHOST TURBINES, giving 5000 lb thrust, being worked on.



THEN TEST RUN on the Comet. Engines are now type at present the Vampire.



POISED ON THE RUNWAY at Hatfield, England, the jet-propelled transport is shown before its first successful test flight.

DH-106 Comet

Engines	4 D. H. Ghost—5000 lb thrust
Approx Span	106 ft
Approx Length	85 ft
Cruising Speed	500 mph
Cruising Altitude	40,000 ft
Crew	4
Passengers	36
Cruise Range	2000 mi
London-New York	6 hr
On order	2, Ministry of Supply, 14, ECAAC

Prototype Transport Bill Revived

Congress seeks means to help U. S. builders develop liners in order to capture lead held by new British craft.

Great Britain's advance in high-speed jet transport has spurred congressional interest in legislation authorizing a government-financed air transport project program to assist the United States' commercial aviation leadership.

There were three developments last week.

• Sen. Edwin Edwards (R., La.) reintroduced a new prototype bill, the Brewster-Bellanca, which was lastly passed in the House last year. Changes in the new bill were accompanied by the reformer-oriented Inter-Departmental Policy Committee, under the direction of Col. James M. Adams, director Delta Airlines, which has been making a study of the subject for the past year.

• Sen. Edwin Edwards (R., La.), chairman of the Senate Commerce Committee, said that his group may take up prototype legislation within the next few weeks. Edwards' original plan was to postpone action until next year, pending the national defense reorganization of commercial aviation, a completed, probably by September. Defense Undersecretary Steve Early is directing this study of aviation.

• Aircraft Industries Assn. called as amicus on the new Brewster Bellanca. Manufacturers International Air Transport Assn. last year by opposing prototype legislation. Possibly that U. S. airlines will look to British firms for new type planes within the next few years. Edwards believes, will yield more interest in a change of position. Lockheed Aircraft Corp. and Douglas Aircraft Co. have recently indicated to Brewster that they now favor a prototype program.

Indications are, however, that the majority of manufacturers will expect that the Air Force undersecretary and transport development. A favorable report of Congress sides with this position on the grounds that when the government is paying for plane development the primary consideration should be military use.

Admiral on the other hand, support a civilian-oriented program, as proposed in both the new Brewster Bellanca and last year's Brewster-Bellanca bill, under which commercial aircraft would be the first consideration in new production. The program would be directed by a five-man board of two military and three civilian experts representing the Air Force, Navy, National Advisory Committee for Aero-

nautics, Civil Aeronautics Administration, and the Civil Aeronautics Board.

Changes—Following new changes from the Brewster-Bellanca bill included in the new Brewster bill.

The board is designated "Aircraft Development Board" instead of "Civil Air Transport Development and Development Board."

It is expanded in the Air Force, but remains independent.

An avian member "Aircraft Development Advisory Committee" representing the public, aeronautics industry, scheduled airlines, airplane makers, and aviation labor (they represent) is established to assist the board. The old bill set up a commercial industry advisory committee and did not designate transportation.

A stipulation is added that the board undertake only transport development "when the aircraft industry would not otherwise develop" and "leave the open market for design and construction for maximum efficiency." This is aimed at meeting manufacturers' objection that under the old bill private interests would be wiped out, with the industry looking places New York in Washington.

Another provision is added that "to the extent feasible the cost of research, experimental and development shall be shared" by the manufacturer.

The Secretary for Air, upon the new recommendations of the board, is author-

ized to recover development activities, possibly by an agreement on each side when a plane is in production. Under the old Brewster-Bellanca version, the secretary was merely directed to recommend to Congress ways and means of recovering government investments in development.

The Secretary for Air is given tight control over patents resulting from government-financed development. The old bill made no mention of the subject.

It is "declared to be the policy of Congress that the Reconstruction Finance Corp. shall participate in the financing" of all loans and sale of aircraft developed under the program. The old bill contained no provision for financing sales.

Airlift Decreases

The Berlin Airlift started on the road to gradual declassification last week by closing more than half its daily loads to the German capital.

Operation Vittles' came up in the statement said in full under sub 920 Berlin's Airlift flights from 1947 to 1948.

The new schedule started Aug. 1, requires only 700 tons per day to be transported to Berlin, still about double the average which was dropped this time last year.

Shipments will be reduced further to 2100 tons daily in September and further to 1000 tons per day in October. This represents will be the last month of the airlift which started about 18 months ago.

Air Force experts to read the first group of airlift personnel back in September.



NORTHROP RESEARCH PLANE FLIES

First flight photo of the Northrop X-4, subsonic research airplane, which did maneuvers and quickly found-out appearance. It though flying over June 5, 1949, was a first flight photo. Cost is designed to test report on higher performance of new subsonic and to determine handling characteristics of such types in the complex

maneuver zone. No. 2 duplicate has now joined the prototype at Marine Air Flight Test. Northrop test pilot Charles E. Taylor, former Thompson Research pilot, has handled all X-4 flights to date. Two 1600-hp Pratt & Whitney 500-hp engines each can fly up to 6700 mph, speed at 18,000 ft., in maximum design speed.

Freight Case

CAB reaffirms opinion; grants certificates to four carriers.

Sticking to its tentative opinion of three months ago, the Civil Aeronautics Board last week issued a final decision granting four-year certificates to four all-cargo lines.

Transcontinental all-cargo route would be St. Louis, San Antonio, and the Flying Tiger Line, Honolulu, Calif. U. S. Airlines, St. Petersburg, Fla., was granted a north-south system out of the Mississippi, and American, Inc., San Francisco, was granted authority to operate between San Antonio and the Rio Grande valley.

Board said—In the preliminary decision (American Wings, May 6), CAB member Joseph J. O'Connor, Jr., vice chairman George Bess and associate Russell Adams invited criticism of the all-cargo carriers. Members John Lee and Harold Jones again issued strong dissent.

Major change in the final opinion was the present preventing the all-cargo lines from carrying passenger stopped by Railway Express Agency in the short run, at least, this criticism may seriously affect the operation of the all-cargo lines, who had counted on handling a sizable portion of REA's profitable air express traffic.

• **Wagon Lines**—CAB again decided that the issuance of two-year certificates for north-south service out of the Mississippi would be to allow traffic to be made easier unencumbered for both. The Board estimated that U. S. Airlines to better equipped financially to weather the initial economic difficulties of re-establishing the new service than Wills Air Service, Trenton, N. J., which wanted a last-but-not-least fight for the route.

The three new CAB majority in its final opinion took special care of changes in the passenger-carrying lines, the Post Office Department and the Board minority that the all-cargo lines would continue to lose money under their certificates and would add, for most part and RUC loans to build them up.

• **Subsidy Issue**—"We have heard," the majority explained, "that the public convenience and security do not require certification of the all-cargo lines for carriage of mail, and have specifically stated that one important factor in our decision is that mail pay support will not be given to the freight carriers. Any speculation that at some other time we might arrive at another conclusion has no relevance to the issue of the present case."

The Board's majority again noted

definitely that certification at a few all-cargo carriers will reflect destructive traffic decreases on passenger-certificated airlines. Incidentally, the Board also said that passenger-carrying lines in certificate as filing the second stage upon or their combination plan either those on extension of all freight routes.

Recently certified carrier lines in their passenger-carrying lines in certificate as filing the second stage upon or their combination plan either those on extension of all freight routes.

• **Landlord Role**—The all-cargo carrier, operating without mail pay, will provide a valuable service by carrying the electronic and efficiency of passenger-carrying lines which also handle freight, the Board continued. "They will also provide a continuing use of capacity for passenger-carrying lines."

CAB recognized that the all-cargo carrier is likely to continue operating in the end during the initial phases of their certificated service.

B-36 Probe Set To Open Aug. 9

Floyd Collins, president of Atlas Corp., and Robert Lovett Armed Assistant Secretary of War for Air will be lead-off witnesses in the House Armed Services Committee investigation of the B-36 crash. It is now scheduled to open Aug. 9. Rep. Carl Vinson (D., Ga.), chairman, announced last week.

The investigation will also cover cancellation of the Navy's \$15,000 in supercarrier and other aerial nuclear status. It was noted following a Senate speech by Rep. James Van Zandt (R., Pa.), a Naval Reserve captain. He reported "high morale" that political influence at the Navy's Secretary of the Navy, former director of Consolidated Vultee Aircraft Corp., manufacturer of the B-36, figured in the Air Force's decision to concentrate procurement on the plane.

Atlas Corp. controls Consolidated. Lovett served as Assistant Secretary of War for Air during the early war years when the B-36 was first projected.

Raise in Sight for Aircraft Workers

Aircraft Industries Assn. concedes pay boost is justified and suggests 80-95¢/hr. minimum; unions want \$1.15.

Increases in the aerospace industry wage rate at least 10 percent on government aircraft contracts of more than \$10,000 appear likely within a few months as a result of the recent Washington wage hearings which reversed a second round of labor contract increases not previously sought in aircraft work, resulting in two wage rates for aircraft work and non-aircraft production, up from the rates for manufacturers involved in the hearings.

• **Union Proposal**—Verl E. Roberts, chief of wage, labor and public contract wage determination division, who presided at the hearings, expects to complete his report on the matter. The hearings were called on the proposal of the CIO United Automobile Workers and the International Assn. of Machinists (IUM) that the maximum wage of 92 cents an hour for non-aircraft workers, in evidence since 1918, be raised to the new rate of \$1.15 an hour.

Wage leader William R. McCarty will testify before the subcommittee on Labor Matters in September. He was recommended by Secretary of Labor Maurice J. Tobin.

Tobin, under authority of the 1916 Walsh-Healey Public Contracts Act, then will do what he feels to be the "prevailing minimum wage" for the

industry. It will go into effect 30 days later.

• **AIA Bid-A** higher minimum rate recently issued when the aircraft industry conceded, in a brief submitted by the Aircraft Industries Assn. that a raise was warranted, that it should be between 80 and 95 cents, instead of the \$1.15 sought by the union.

That the new minimum will be at least 95 cents was suggested by Verl E. Roberts at the hearing. He said at that time that a survey by the Bureau of Labor Statistics last November showed that less than one-half of one percent of the 16,000 aircraft employees work on government contracts earned less than 95 cents.

• **Inc. And Stud**—In a number of recent cases, Tobin has granted the full increase proposed by the union. The latest was in the iron and steel industry, in which Tobin raised the minimum to \$1.05, \$1.19 and \$1.23, depending on the region of the country. The old minimum ranged from 45 to 60 cents an hour.

The aircraft industry's head was submitted by Admiral Dewitt C. Kenney, AIA president. Legal, technical and statistical points were made by Henry G. Heintz, AIA counsel. C. White, Chief of Paschall Engine & Airplane

FINANCIAL

Airline Earnings Improve Credit

Securities yield of American, United and Northwest shows how traffic upsurge aids market standing.

Airline credit is steadily improving a consistent improvement in investment standings. Recent banking gains in traffic and earnings have markedly improved the airline financial outlook.

A reflection of this improving investment status is found in the steadily rising market quotations for airline securities.

■ **AA Debentures**—American Airlines 5 percent debentures, due June 1, 1966, have been selling into new high ground recently and have been recorded quality investment trading by a number of groups. With current quotations around 57, the indicated yield on these debentures is around 3.5 percent.

These debentures, at the amount of \$40 million, were marketed in June, 1964, by a syndicate headed by Lehman Bros. at a price of 102 to the public. The underwriters are known to have taken a large loss in this financing, as the price at the debenture's decline almost immediately. A loss of 70 was established for this issue during 1967. For 1968, these debentures fluctuated in price from a low of 67 to a top of 78. At the start of this year, these debentures were quoted around 77, and have shown consistent improvement in reaching their present market level.

■ **UAL, Picked Up**—Interestingly enough, the debentures of United Air Lines, as being supported substantially as a result of the higher volume being accorded the American bonds. United, only in 1967, placed an original debenture issue in the amount of \$12 million with two separate offerings, \$10 million in the Metropolitan Life and the balance with the Mutual Life. As these bonds have no public market, the National Association of Investor Counsellors are known to have assisted the United debentures in the same position as established by the AA issue.

Less fortunate is the Equitable Life Assurance Society of the United States which now recently directed by the more aggressive agency to carry the UAL and UAL debentures, actually outstanding, at 50 cents on the dollar despite the outstanding recovery in earnings being made by that carrier. The Equitable also owns \$10 million of the American debentures.

■ **Preferred Shares**—The improvement in airline credit standings, also has im-

proved the position of senior equities of the carrier as represented by their preferred shares.

Less than a year and at the outset of 1969, there was a considerable question as to the ability of many airlines to be the contributors of dividend payments on cost of these outstanding issues. It is now known that a number of constructive directors of the airlines recently were inclined to favor continuing dividend payments when current earnings simply did not exist to support such distributions. In all cases, however, unbroken dividend payments were maintained.

Certainly, this unbroken dividend record can be considered as a favorable factor at this time in the higher market valuation being awarded these airline preferred shares.

American Airlines has 400,000 shares at a \$100 par value 31 percent convertible preferred now outstanding. It used to be the public in June, 1966, the price of these shares declined almost immediately, indicating a poor understanding of the airline industry and the actual positions a very unwise time. A low of 47 was established for this issue in the late 1940s on trade. As the improvement in the fortunes of American Airlines came evident, a steady gain in market valuations took place this year with current prices around 64. At the start of this year, the indicated yield is around 3.5 percent, the lowest for any of the airline airline preferreds.

In other words, the in another step of the market's opinion that there may be less uncertainty, relatively, as to the continuation of dividend payments. ■ **Recovery**—The United preferred has made a substantial recovery marketwise this far this year. These shares, about 95,000 outstanding, were marketed around \$185 per share in January, 1947. As the market began to recover at its credit standing, a steady deterioration in market prices developed with quotations establishing a low of \$57.30 late in 1949.

Added that by added mail pay and subsequently by an improvement in its own operations, the company's outlook seemed a more favorable atmosphere. As a result, the market price of the United preferred made a rapid recovery to present levels of around \$152. At this price, the indicated yield is around 6.2 percent.

■ **NWA Comeback**—Northwest Airlines has the second rate of preferred shares among the major lines. A total of 170,000 shares of 4.5 percent preference shares were marketed at \$25 per share in April, 1947. Probably the greatest appreciation, surrounding converted dividend payments was evidenced on these shares. This is evident by the decline to \$11.625 per share recorded for this stock earlier this year.

Added by two separate mail pay increases and a recent speculative increase in operating revenues, better credit has been imparted to the company's securities. With the preference shares now quoted around \$17.50 per share, a current yield of about 6.75 percent is indicated, the highest among the senior airline equities.

With recent-breaking traffic and earnings reports being released for the summer months, there has been little doubt as to the continued dividend distributions on all three issues during this period.

Should earnings go into reverse, however, for any of the carrier issues, it is obvious that doubt as to continued dividend distributions will appear.

On the other hand, a strong combination of current traffic and earnings for the airlines involved can be turned forward to reflect a further improvement in airline preferred market prices.

■ **Attractive**—A large attraction to all three preferreds is the conversion feature. Convertible into common stock, increasing speculative value is attached to these senior equities in periods of rising markets. Each share of American preferred is convertible into common at \$71 per share or about 4.6 times of common for each share of preferred. One share of United preferred has a call on four shares of common. Each share of Northwest preference stock is convertible into one and one-half shares of common.

This conversion feature is of great importance in cases where earnings begin to fluctuate very rapidly and become available to the common stock in an increasing measure. Under such conditions, the market quotations for the common shares are quick to reflect their improved outlook. As dividends increase, as the preferred shares are found to be valued more, participation in a greater distribution of income that may be made available through increased dividend payments on the common is possible only through conversion of the senior equity into common shares.

This development would unquestionably place the airline management having preferred shares outstanding. In the final analysis, the status of airline obligations and equities will be determined by the earnings outlook of the individual carrier.

—Selig Altschul

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AERONAUTICAL ENGINEERING

Fokker Has Broad Production Program

Includes jet and piston-powered fighters and training craft.

After Britain and France, Holland is the most significant Atlantic Pact air power on the Continent. Although its industry is small it is highly organized, and on the showing of its invulnerable piston reactors from near destruction by the Germans, is capable of rapid expansion.

Most Dutch design and production work is the Fokker concern, with De Schelde and Avionsnede doing little at the moment except for repair work.

These three companies were grouped in 1945 in Government direction. Although the post-war years were largely unproductive, in effect the three parent plants went their own ways and the Government has finally succeeded in the face of the short-lived United Dutch Aircraft Factories going.

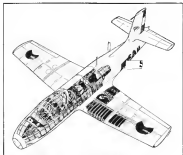
► **Dutch Plan**—One of the biggest moves yet towards the integration of air defense between the European members of the Atlantic Pact is the arrangement between the British and Dutch Governments whereby the latter will build a large number of Gloster Meteor jet interceptors of a new type for their own force and for the Belgians. These will supplement the Meteor already supplied by the British to both air forces.

Actual production arrangements are between Gloster Aircraft Co. and Fokker at Amsterdam (for several) licensed Meteor 10 to be built at Eindhoven. They are already being qualified in the Amsterdam factory, with assembly of the first 50 machines from parts sent by Gloster slated to commence before 1950.

Remembered of the order is expected to be built entirely by the Dutch and should start coming off the line in early 1951.

The Belgians should receive half of the total batch and will supply Royal-Aeronautique 5 jet fighters from one of its own national aircraft factories under a license being negotiated.

Latest report from Amsterdam states that the Dutch Government has placed an order for 500 Gloster Meteor two engine jet fighters with Fokker. This is the largest order ever obtained by Fokker and will enable it to continue its planning for a new type of jet aircraft. It is also the first example of



Fokker S14, piston-powered trainer, has side-by-side seats, fuselage dive brake.

British industrial coordination and provides standardization of West European air power.

► **Training Planes**—Two Dutch fighter squadrons are already using British-made Meteor 10, and to visit on very transaction from Dutch Airways to the jets several Meteor 7 two-seat trainers are also being supplied.

The Meteor 5 is a still poorer version of the Meteor 4 and should do even better than the latter model which, with a 1150 gpm rate of climb and a 47,000 ft ceiling, is already one of the best interceptors in quantity service anywhere.

Further Meteor squadrons will come up as places and crews become available, but, as in Britain, recruiting for the Dutch Army Air Force is still a problem. Also, at the end of only a small case of RAF-trained Dutch pilots and the remnants of the pre-war Dutch air service control and there have had to train a large number of new personnel with qualified success and ground instructors.

The training is still going on and is set from the major part of present Dutch air service work.

With an exchange jet fighter can power planned for its air force, Dutch role in an amount upon the Atlantic

Pact nations could be easily detected and coordinated with other Commonwealth air forces to form a permanent fighter screen about the Atlantic and more efficient bases of the United Kingdom.

► **Fokker Activity**—Apart from their Meteor contract, Fokker is engaged on some interesting work of its own. Under Air Force direction they are working presently to the design and production of new training aircraft. Fokker chief designer, looking back after experience in building and testing the Meteor, the company will be able to come up with something of its own in the field.

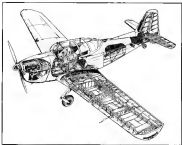
Meanwhile, various transport and freighter designs proposals have been submitted to KLM but so far have no concrete backing.

The specially F-26 Phantom train. Now jet fighter is believed for the time being the design can be too radical to move more than passing interest from officials.

► **Specialty Craft**—Present Fokker production is as follows:

• **S11 Instructor**. One hundred of these primary trainers are on order for Iran, Japan, Dutch air organization and Fokker lightplanes.

The Army Air Force is at present no



Development S11 bomber also has air-to-air role. Now wheel version is S12

getting for 10 of them for service testing. 16 will go to civil schools and another 10 to the Dutch East Indies.

The S11 was designed with recent British bomber ideas and experience in mind so that it fulfills the industry's desire for a bomber with provision for a new three-seat (Aircraft Weekly, June 6, 1945). In line with current American and British practice, performance is better and equipment more comprehensive than previous engine versions.

In the branch of British test pilots at Wallingford, RAF experimental testing time, the S11 came out with a top speed, and many hoped it would have been a better choice for the RAF Valley test Bomber than the modern test, Canberra-designed Chinook.

The British Lightning G-435 A is an excellent choice of engine, since the engine, base, three auxiliary sets, the wide cockpit, but, dollars being scarce in Europe, foreign buyers may prefer the alternative German Bombardier or French Martin G-8 R.

•S12. This craft is the S11 with a nose wheel. Idea behind introduction of this model is that a training organization can use both planes and teach one wheel and tail wheel landing techniques with the same base type.

The S11 and S12 are not readily convertible one to the other, however. To provide for adjustment of both under carriage would mean an increase in structural weight, and in any case would be too expensive. As it stands, an organization using S11s, also wanting to teach nose wheel technique would either have to have some of its aircraft factory converted or order S12s separately.

In other case, duplication of parts would be needed, since both types are otherwise identical.

•S13. This plane is being built for the Army Air Force to replace British Avroco and Oxford in crew trainers, and provides better single-engine performance, range, load, and crew capacity.

The Pratt & Whitney powered prototype is nearing completion and should undergo shakedown tests in September.

•F25. The last batch of Pioneer forecast primer personnel planes now on the line is 144. Parts because the American export had to be bought in short supply of \$3.5 million, sale of this sophisticated little aircraft have been slow.

•Sea Fury. Twenty five Sea Fury Navy fighters are slated to be built for the Naval Air Service, four of which should be ready in mid 1950.



S13 new trainer has P&W powerplants

Parts are already being made, and the batch will eventually find its way to the Light Fleet Carrier "Knox" Doorman in other training under construction in Dutch Navy yards.

•S14. This craft is probably the first biplane trainer designed from the start to incorporate latest RAF training ideas. The British Aircrew and British Aircrew Training and, in any case, are in a different power and performance category.

Designed specifically for advanced pilot training, the S14 has a devoted Dornier 5 and should operate at about 150-450 mph.

Extremely high performance is not desirable during advanced training, but P&W is not overlooking the possibility of a biplane model for night fighting and other possible military roles.

Parker inherited their original design to the British Ministry of Supply for night fighters and then incorporated most of the ideas in the RAF type specifications they received in return, perhaps with an eye towards RAF custom if the S14 is successful.

•S14 Design Details. The plane is a cantilever low wing, attached conventional with retractable tricycle undercarriage. The tapered wing consists of 4 parts—2 center-sections bolted to the fuselage and two detachable outer panels. Split type landing flaps are used. In addition to the fuel tanks in the center section, two 500-gal ones are used in each of the outer panels.

Construction loads have electrically driven booster pumps to direct fuel to the engine. Fuel from outer tanks is fed to the engine by air pressure.

Passage has a circular cross-section. Making it of light metal construction, with the exception of the engine compartment which is steel and wood.

The body is divided as follows:

•Fuselage nose, in which the nose-wheel is situated in forward position. Installed here are instrument and compass, engine, oil separator, valves and rods of the pneumatic system for the operation of undercarriage and dive and landing flaps.

•Nose-wheel in the nose, divides in two channels, carries on each side of the attached nose wheel.

•Cockpit, accommodating a pupil and instructor seated side-by-side with dual controls. Behind the two front seats (separately) is control panel third seat, with air intake ventilation into the fuselage.

The main lower and handles are fixed to a control box in the center between the two pilots with the exception of the throttle and dive-bombing controls, which are attached on each side.

Adams, elevator and rudder can be locked from the cockpit.

Electrical installation, with the exception of the batteries, which are installed on the cockpit floor, are located

What can you do with 400-cycle frequency —ACCURATE TO 1 PART IN 1,000,000?

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Present designs of this electronic regulated inverter include 500 and 750 volt-ampere capacities, producing 115-volt, a-c output from 115-volt, d-c input. Write for further details or for help on your electronic equipment development problems.

between the flow and can be easily inspected via film ducts.

Oxygen equipment is installed in the cockpit.

The hood can be opened manually or electrically and is jetted off.

► **Engine compartment**, situated in the center of the fuselage above the wing, and surrounded by steel walls.

Space between engine and wall allows all engine parts to be easily accessible through inspection openings in the upper and lower fuselage skins.

The engine-driven accessory gearbox mounts a generator, an compressor and vacuum pump.

► **Fuelage rail compartment**, across midsection of jet pipe, which is surrounded by a cooling channel.

The exhaust pipe is mounted on brackets, allowing the pipe to be pushed back for turbine blade inspection.

Two brackets are fitted on both sides of the fuselage, behind the wing.

The canister stabilizer, fixed on the upper side of the fuselage, is of light-weight, stressed skin construction.

Electronic, also of light metal structure, is statically balanced and is provided with a trim tab adjustable in flight.

Virtual fuel fuselage area next with the fuselage end.

The light metal stabilizer is fitted with a ground adjustable trim tab.

Mainframe and nose wheel are fixed support system type with heavily braced spring shock absorber.

Mainframe is subjected stresses into the center section, between the main and auxiliary spars.

► **Difficulties**—In step with its extensive and increasing production, construction, facilities, building a new new factory at Stuttgart, the Austrian airport. First hangar is nearly complete, and plans are being drawn for the main building blocks.

However, some serious difficulties are clouding the outlook of Fokker's Austrian program. Due to several circumstances, one of which is related to the merger with the other aircraft factories, no annual reports for 1947 and 1948 have so far been published. It is to be feared that substantial losses have been sustained.

Difficulties are not to be mainly at a technical nature. The Pannavia engine aircraft, for example, had been equipped with a propeller which turned out to be unreliable. The Spanish program, which had purchased a number of these aircraft, refused to accept them. Dutch authorities withdrew their contracts for the plane, because of the propeller difficulty. New proposals have been ordered in the U.S. market.

Some difficulties have also arisen in regard to the new S-11 trainer, and orders for this aircraft have remained below expectations.



Pressurized range for model studies in new aeroballistic facility at Naval Ordnance Laboratory. Some new installations along tube length record payload's behavior.

Navy's New Aeroballistic Range

Pressurized, 300-ft. tube used for missile study under wide variety of conditions. Camera record action.

By Robert McLaren

Progress in aeroballistic research demands first of all progress in the design, construction and operation of research equipment. In this respect, the United States is easily a double ahead of the rest of the world. But this was not so prior to V-E Day, when Germany had the world by a safe margin.

Our scientists are today now beginning to move out ahead of where the Germans were more than four years ago. It has taken that long to improve and, in many ways, to duplicate the equipment and techniques as we are pleased by the Navy.

► **Model Range**—An important example of such German conceived equipment is the pressurized aeroballistic range recently dedicated at the new Naval Ordnance Laboratory, White Oak, Md., near Washington, D. C.

The device, certainly, comparable to a scaled tube three feet in diameter and 100 ft. long, does the length of which is made outside a fixed. After the length of this tube are 25 camera stations which photograph the missile in three dimensions as it progresses down the tube.

Importance of the NOL version of this unit is that it can be pressurized to an atmosphere or evacuated to a pressure of only 0.01 atmosphere, pro-

viding a wide range of Reynolds numbers for tests.

► **General Idea**—The basic idea for this new facility was developed by the German of the Luftwaffenforschungsinstitut Hermann Göring (LFA) near Wehrschering, Germany. One of the facilities at this laboratory research center was the Heberkond, an high-altitude ballistics range, constructed as a building situated on a mountain face.

This underground range was 1440 ft. long and 29 ft. in diameter. It could be evacuated to a pressure of 0.02 atmosphere or pressurized to five times an ambient air pressure. Stationed at intervals along the range were 25 cameras, in each apparatus which were located opposite two cameras (not vertical, one horizontal), which took three pictures at 1/1000th of a second.

The camera stations were left open in the darkest tunnel but the opening provided the light to expose the photo graphic plates. The spots were triggered by the missile making contact between two thin sheets of metal as it approached each station.

► **Improvements**—Scientists of the NOL have improved upon this basic idea in several important ways, chief of which is pressure making that can be corrected. The importance of this was lies in the ability to produce wide variations in Reynolds numbers, in order to be

similarity of aerodynamic action.

There has been considerable discussion among research scientists as to the efficacy of measuring the LFA range in order to simulate high altitude conditions. The Germans applied thought that if they used full scale weapons in the range, then evocation of the natural wind pressure Reynolds numbers equivalent to those encountered when firing the same weapon from an aircraft at high altitude.

While this is, of course, quite true, scientists point out that, since the reduction of the density in the tunnel greatly reduced the intensity of the aerodynamic action, the accuracy of the results was impaired and necessary results required more difficult.

► **Reason for Improvements**—The later idea of measuring pressurized NOL, scientists to design a range which could be pressurized. Since the tunnel can be pumped to an atmosphere and full-scale speed tests, the range can be directly applicable to a missile in flight as large as the model.

These results can also be used for the design of models any given time as large as the model through the use of suitable extrapolation coefficients, but their accuracy varies inversely as the scale of the full-scale model.

The ability to evacuate the range to a pressure of 0.001 atmosphere permits simulation of conditions existing at about 110,000 ft. altitude. Wind tunnel work at this high simulated altitude presents problems in super-sound waves (Aeronautics Weekly, June 22, 1948).

At the density of the air is increased, the boundary layer grows in thickness until it only moderate approximate Mach number it can completely fill the throat. This boundary layer depends upon the length of the object along which the air is flowing, in this case the tunnel wall.

By using static air within the range tunnel, and firing the missile through it, the boundary layer on the missile will be quite small compared to the tunnel diameter. Therefore, test results can be obtained at much lower densities and much higher Mach numbers. This means the range has important positive is a means of extending data into the ranges of hypersonic and super-aerodynamic flow.

► **Construction**—The 300 ft. tube was built by the Naval Gun Factory and is made up of seven-inch-thick, solid steel plate sections connected with flanges. The tube weighs about 330 tons.

The Naval Gun Factory made numerous test guns, etc. that enabled them to build balances equal to those used in guns and machinery aboard ship. The tube is mounted on National

Pipe and Valve Co. 1301 supports, enabling the loading to expand and contract under the tube, which has only one end fastened to the floor.

The 35 photographic stations consist of a target, a spring and a firing device to separate the three-dimensional attitude of the model and the time of the picture. Two sheets of photographic film are used, one mounted vertically and one horizontally. The horizontal plates follow the contour of the walls to within 20 ft. in an amount from a vertical table, and are level within 0.01 in. per foot.

All other dimensions, such as the alignment of the vertical plates, distance of vertical plates from centerline, distance of spots from corner, etc., are held to measurable tolerances. The vertical plate holders, mirror mounts and other interior parts were made by the Wilmer Machine Tool Co. and the Balmain Corp. of Baltimore, Md.

► **Photo Apparatus**—Each station is equipped with a source of light and a photometer cell on opposite sides of the photographic station. As the test missile approaches this light the cell senses a short duration spark.

The light from the spark flashes directly across the station to a vertical photographic plate and, simultaneously, spreads to a mirror which reflects it down to the horizontal photographic plate on the tube floor. At the same time the spark sends a signal to an RCA oscilloscope, which is capable of detecting one ten-thousandth of a second.

Each photographic plate holder has a base line and a reference mark which are exposed into the film by the spark. The attitude of the model in pitch and yaw together with the exact time of the photograph is obtained. An array of the 35 stations can be mounted into the firing device, permitting either a

full flight record at slightly longer intervals or a record of very close intervals over a portion of the flight, depending upon the conditions of the test.

In order to establish and maintain the desired conditions within the barrel, vacuum pumps, pressure pumps, drive and control air, are available thereby permitting stabilization of the desired Reynolds number of the tests.

► **Models**—The test models are machined from solid steel to exceptionally close tolerances, accuracy because of their small size and the high Reynolds numbers desired. A robot secures the model to the ceiling of a 20-in. gun barrel and is removed after firing by a guard slightly downstream of the muzzle.

The gun is a 14-in. type modified down to a 20-in. barrel in order to provide extremely high pressures and muzzle velocities.

Pressure equipment can produce an initial model velocity of 6200 ft. per sec. The model drops from a fraction to several inches (depending on its observed) during its one-fourth of the range and comes to rest in a sand bed.

► **Super-sound**—Finally, the new aeroballistic range is intended to be used in conjunction with the Kistler wind tunnel now in operation at the Laboratory to check and amplify wind tunnel test results. Its pressure range from a maximum of 10 to an atmosphere greatly extends the range of the data to determine exact Reynolds number effects at speeds up to 5000 mph.

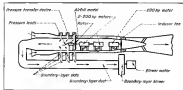
The new range combines features of the wind tunnel, the free fall method and the rocket test method all in a single facility and thereby comprises an important new research tool that encompasses existing equipment and extends the range of data available into new areas.



COPTER TRAILER CUTS FLIGHT COST

Designed to end expensive tests, the trailer designed for Hilly 160 enables operators to bring "copter directly to

location and use where cost will be saved. Two truck trailers in duty by carrying extra film, instruments, and personnel.



Schematic diagram of Langley's transonic tunnel.

First Successful Transonic Tunnel

NACA research facility uses rotating arms to carry model, eliminates troublesome "choking" condition.

Transonic research has been frustrated ever since the first World War II by the seeming impossibility of attaining accurate wind tunnel data at the speed of sound.

An NACA member, L. D. Appleton, clearly as a wind tunnel, a normal shock wave is formed across the most restricted area of the duct, which is usually directly across the model, where its presence in the flow induces the first loss to a transonic flow. This "choking" condition occurs, shock waves from the model to the tunnel walls and back to the model, destroying the accuracy of the data being recorded.

► **Solution Varies**—To obviate this condition, researchers have studied a number of expedients, some simple, some very elaborate, all of which involved enhanced techniques, including free-drift, wind-tunnel, and rocket-borne systems.

One thing could be done in the tunnel shaft, the "tunnel," which provided highly localized regions of sonic speed and in which data may be obtained providing the tunnel is very large in relation to the model.

► **Stack's Plan**—It was at a time when the most renowned aerodynamic scientists of the world had agreed themselves to such methods of obtaining data at sonic speed that John Stack, NACA research scientist and 1947 Guggenheim Fellow, conceived the system shown in the accompanying schematic diagram.

By mounting the model on an arm, which rotates as a free-wheel, he avoided the choking "choking" effect and made possible the first accurate recording of data smoothly through the transonic zone.

Development of large-scale transonic tunnels for wind tunnels (AMERICAN

WEEK, June 28), will give even better results than Stack's device by enabling tests of larger models. But Stack's system, as the first practical solution of a transonic problem, is worthy of study for other possible benefits.

► **Operation**—The tunnel consists of an internal cylinder which creates an annular space through which air is driven by a 200 hp induction fan. The model is mounted in the duct which rotates on an arm which rotates about a longitudinal axis.

The model follows a helical path with respect to the upstream, and this makes it possible to attain sonic speed in a section of the duct. Because of the latter fact, no problems of transonic flow are presented, although data at the speed of sound actually is being obtained.

► **Boundary Layer**—Since the region in which the model is operating is restricted, boundary layer problems are more serious than in the case of a small model in the center of large wind-tunnels. Therefore, boundary layer sections are used along the inner and outer walls of the tunnel forward of the location of the model.

The problem of sucking away this boundary layer required the use of an internal duct, the flow in which is created by a blower. The air is drawn forward from the slots, carried out the side of the tunnel, and returned down and around, where it is exhausted through the blower.

► **Only 600 HP**—The model is rotated by two 200-hp motors geared to a single shaft and the entire tunnel is rotated only 800 hp for its operation. However, this small power, together with the comparatively small size of the tunnel and model, permits three-dimensional testing only of low Reynolds

numbers and, therefore, limits the effectiveness of this particular installation. One of the problems posed by this tunnel configuration was that of interference. This was solved by an ingenious pressure transfer device which carries transducer pressure from the model outward down through the rotating arm and into the shaft. It is taken from the shaft through a series of pressure-resistant transfer rings and thence to the transducer head.

The tunnel has been in operation at NACA Langley Aeronautical Laboratory at Langley Air Force Base, Va., for more than a year.

Fiberglass Blades Pass Flight Tests

Molded fiberglass helicopter rotor blades have been successfully flight tested at Wright-Patterson Air Force Base, Dayton, Ohio, by the Air Materiel Command, installed on a Sikorsky H-15 helicopter, tested under modified lift and reduced power requirements. The blades were developed by General Electric Aircraft Division, Buffalo, N. Y., under AMC research contract.

The blades have a 20-in. chord and are about 21 ft. long. Molded in a single operation, they use a lightweight fabric core.

High pressure permits the material use of an extremely smooth aerodynamic surface finish.

► **Molding Process**—First step in the process is to curve a blade from latex in a mold with dimensions only slightly less than the finished blade. The latex is then wrapped with Fiberglas cloth reinforced with a layer of plastic. The wrapped blades are then placed in a mold and heat and pressure are applied. The 21-ft-long 2-in. thick preform mold, the plastic cover into a smooth, aerodynamic shape.

► **Improved Performance**—The greatly improved strength and rigidity of the new blades reduce drag, thereby increasing L/D ratio and making possible increased payload. The aerodynamic lift is kept to very close tolerance, thereby improving performance. Reduction in blade flexing due to increased rigidity preserves the aerodynamic form of the blade segments, also contributing to increased performance.

General technology in engineering research with emphasis on a new core honeycomb with Fiberglas cloth. It is said that these new blades, upon completion, will be even lighter than the present blades now blades but will retain the same degree of aerodynamic efficiency.

NEW AVIATION PRODUCTS



Prop Synchronizer

Improved propeller synchronizer designed to meet requirements of latest military and commercial multi-engine aircraft is announced by General Wright Corp., Caldwell, N. J.

While retaining operational features of previous Curtiss type synchronizers, new design includes modifications and servicing by enclosing mechanism in standard aircraft type metal case supported by air shockproof mount.

Between permanent mounting and removable synchronizer case in place in electrical and mechanical connection. To install a synchronizer, it is only necessary to slide metal case into place after setting required control lever in takeoff position.

Built-in filter eliminates need for constant connection between synchronizer and separate filter component. Previous case have been made for use of standard engine lubrication, connected to standard engine oil reservoir system, instead of special lubrication previously used. Dimensions are 34 x 124 x 251 in.



Abrasive Wheels

For heavy grinding, light grinding and for certain types of cutting, abrading and finishing operations, new bonded "Flyers Red" wheels made from heat-treated sheets of cotton fiber filled with

abrasive grains, are offered by Standard Abrasive Co., Quincy and Quincy 80, Philadelphia, Pa.

Wheels are supplied in 7 and 9 in. dia. depressed center type for portable disc grinders and right angle grinders, and in 6, 8, 10, and 12 in. dia. x 1 in. thick straight discs for cutting and general use. Material is said to permit accurate amount of side pressure without risk of buckling, to cut fast and clean without burning at edges.

Wheels are claimed to be especially suitable for weld grinding, are standard and for cleaning rough surfaces on structural steel work, fabricated metal parts, etc. They will cut EX cable, busbars, cables, Missouri lead-board, plastic, asbestos as well as most metals.



Small Rivet Tool

For light riveting operations with substantial safety and standard costs. "Pin Buster" offered by Keller Tool Co., Grand Haven, Mich., is also claimed to be useful for setting small rivets and for light painting and sanding on thin sheetmetal, blades.

With 100 strokes it has speed of 9000 blows/min. Device weighs 13 oz., is 6 1/2 in. long and has piston dia. of 19/32 in. Tool is supplied with blank rivet set.



Measuring Device

Designed to speed work of tool makers, inspectors and bench workers, Vernier height gage has sliding base which permits direct readings from 0-6 in., and dimensions necessary for computations and consequent possibility of error.

Made by Vaul, Inc., 2901 E. Colorado St., Pasadena 8, Calif., scale is adjustable and zero setting can be maintained at all times. Unit incorporates surface point on jaw for direct levelling on parts and hole in pen permits quick attachment of indicator for all types of inspection.

All gaging surfaces are hardened tool steel. Use of beryllium copper leaf springs in contact with base prevents flexing and bending operations, new bonded "Flyers Red" wheels made from heat-treated sheets of cotton fiber filled with

Tests Prop Governor

Improved "Governor" for engine service, made by Goss Hydrostatics, Inc., 450 Fifth St., Brooklyn 15, N. Y., features larger adjuster, bigger variable speed drive, and larger reinforcing pump element.

New unit makes possible testing late model prop governors having positive support and higher operating pressure. Drive power has been increased from 5 to 75 hp. Feathering control has 2 hp. motor and 3 gear pump, instead of 1 hp. motor and 1 gear pump previously used. It is claimed, however, accurate on device permit testing governors in less than 10 min.

at Air Associates president. He took office in January, 1955. At that time the company had sustained a loss before tax credits for the first year ending Sept. 30, 1954, at over \$150,000, and it was continuing to operate at a loss.

In order to bring about the present happy financial situation, Gagg and his management put the Tulelake operation through a financial reorganization, closed and sold the manufacturing portion of the Los Angeles plant where the radio equipment formerly was produced, and reorganized the engineering division under Dr. E. C. Black. As a result of these moves and an increased sales promotion program, sales for the previous year totalled approximately \$6 million, and it appears likely that this year's sales will not fall below last year's mark.

► **Motors And Seal Belts**—Bogert single stream manufactured by Air Associates are its mainstay and best sellers. In addition to belts, shaft gears and cranks, the seal belts come in varied colors—light green, maroon, light blue and brown—all to air force manufacturers or airline specifications. The company at the present time is the largest seal belt producer in the world.

Its government subcontracts also have been varied.

► **McDonnell Douglas**—A recent project has been that of engine flaps, a butterfly type valve that regulates air intake at the nose.

► **Fakefield Parole**—A complete steering system, consisting of screw jacks, actuators, hydraulic valves and cylinders, steering wheel, etc., all manufactured in the Tulelake plant.

► **Republic F-84**—An actuator to open and close the canopy.

Other subcontracting work has been performed for Lockheed and Grumman Aircraft.

► **No Surplus Equipment**—At one time Air Associates handled very surplus aircraft, and it was during that period that the company fulfilled a request from an Argentine company to supply a complete outfit, including guns, aircraft and instruments. But concerned that the market demand for war surplus was diminishing, Air Associates ended its agency agreement with War Assets Administration and returned the remaining inventory of aircraft and aircraft parts to the government.

► **Began As Club**—The company began more than 20 years ago as a club at Garden Park, Minnesota. A. B. Private pilots pooled money and kept some spare parts on hand so they could repair their planes. Soon, pilots from other fields came over to Curtis and began to use the equipment.

It was at this point that commercial aspects of the association presented themselves. And it wasn't long until the

C-124A Puts On Wings



► Douglas Aircraft's Long Beach plant, where the 327 ft. length of C-124A is tested.



► With 275 ft. wing. Prototype of the transport is scheduled to fly as Nomadic.



Powered with two Pratt & Whitney 5600 engines, the C-124A is designed to carry maximum cargo load of 25 tons for 800 miles at 120 knots Mach speed. Men cargo compartment provides 14,400 cu ft capacity, with another 1150 cu ft in auxiliary

compartments. Capable of carrying about one military airport except a heavy tank, the C-124A has a not loading hatch with electric hoist, in addition to the large nose door which lets down a ramp permitting vehicles to drive into the hold.

group incorporated and went into business on a large scale.

Company officers, besides Gagg, are director H. C. Barney M. Gies, vice president, G. S. Kuehnert, secretary-treasurer, and E. J. Miller, assistant secretary. Gilbert Colgate is chairman of the board of directors which includes G. Kuehnert, Butler, A. McGuffee, Earl M. Newton, Blaine S. Page and Gagg.

Aeroneca Expansion

Aeroneca Aircraft Corp. has purchased \$500,000 worth of plant real estate, machinery and equipment at Middleton, Ohio, from the War Assets Administration. Aeroneca has also obtained a \$175,000 loan from the Reconstruction Finance Corp. Both purchase and loan are part of Aeroneca's expanding subcontracting program.

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Invest in automatic navigational SAFETY, Dividends are yours instantly. The most practical flying insurance and mental assurance obtainable.

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ADF!

Lear ORIENTER™ A world-wide, long range type of navigational and receiving instrument. Automatically "POINTS THE WAY" (on the Azimuth Indicator) to any Low Frequency Radio Range Station or any Medium Frequency Broadcast Station.

Use these stations as your private radio becomes day or night. Guarantees your destination always.



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PRODUCTION BRIEFING

► **Firestone Tire and Rubber Co.** is producing an "Apron" shopping bag for Westinghouse. The polypropylene reinforced steel container designed to protect the engine from flying shrapnel, presented to protect the engine from shrapnel.

► **Aerwork Corp.**, Alhambra, N. Y., has contracted with Coastal Air Lines, New York, to supply the national carrier with Pratt & Whitney R-2000 engines on a light-weight retrofit basis for aircraft rental fleet. Pratt & Whitney, Tel Aviv, Israel, and Zermel, Switzerland.

► **Standard Thomson Corp.**, Dayton, has entered an exclusive licensing agreement with Teledyne Controls Ltd., England, permitting the Dayton plant to make precision instruments for electronic control temperature controls and making devices for lap controls and other aircraft instruments.

► **Westinghouse Electric Corp.**, lighting division at Cleveland is building 357 new shoplight approach lights for airports for the USAF, an application recently approved is standard by the Army-Navy civil command.

► **National Aircraft Standards Committee** is drawing up a new specification for the use of titanium metal in military aircraft.

At Market Associates, Dallas, members of the new lightweight FlyFree for jacks, has approved Lockheed, Inc., New York, as sole representative for distribution in all countries outside the U.S.

► **G. M. Glumac & Co., Inc.**, Pasadena, has opened a branch office in the Boeing Seattle factory, for liaison between Boeing and Glumac's rapid response development group, as fitting high speed flight instruments to aircraft available in new airplanes.

► **Boeing Aerospace Co.** expects its new development relating engine, which will have 100 to 120 lbs. to give weight of planes of Starfighter size will be applicable mainly for quick rakety aircraft and will not be used in its present form in commercial aircraft because of its weight penalty.

► **Canadian Car & Foundry Co.** has virtually completed renovation work on approximately 200 North American Harrier (AV-8B) trainers for BCAF.

► **Two Rapid Corp.**, Modesto, Calif., has been awarded the armed services Production Purchasing Agency contract for rebuilding and relining all USAF and other U.S. government planes at 72 aircraft in Europe, South America, Central America, Canada, Iceland, Bermuda and the Caribbean for the third successive year.

Latest Air Force Bid Awards

As United Commercial announced bid values available to Air Force West, the latest bid awards, follows on the page. Requests for further information should be addressed to Contracting Office, AFM, Wright-Patterson AFB, Dayton, Ohio, at (618) 243-3777.

AWARDS

For technical assistance—(44-1480): Computer sharing—General Electric Co., Syracuse, on a bid of \$971. Deloitte Haskin & Sells, New York, on a bid of \$70.89. Genco City Co., Portland, N. Y., on a bid of \$19.89. Sherry Engineering Co., Springfield, Mo., on a bid of \$157.50. And Computer Unit Products Co., Inc., Columbia on a bid of \$1.75. on a bid of \$10.00. For research—(44-1480):

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Engineering BETTER¹ RESOURCES MEAN BETTER PRODUCTS

Better engineering resources have enabled Bendis-Pacific to design and build lesser hydraulic products of which the Bendis-Pacific No. 40744 Pressure Regulator is an outstanding example. Extensive design and engineering facilities, such as those shown below, together with complete research and testing laboratories under one roof, assist in the development and manufacture of Bendis-Pacific products.

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Design Room, Hydraulic Engineering Department

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Now Available To You **SIoux** VALVE CLEANER

Provides a fast, easy method for clearing dirty valves—removes carbon and scale quickly and thoroughly. For valves up to 2 1/2" diameter and 1 1/2" stem. Cabinet of sheet steel, 33" high, 12" square, finished in dark gray.

View showing interior of
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No. 584 Comes complete with air gauge and cabinet and 5 lbs. of aluminum oxide abrasive. Operates on 120 line constant air pressure.



No. 583 Shows specifications on No. 584—
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SALES & SERVICE

Lightplane Operating Costs Studied

University of Illinois survey of its 32-plane fleet reveals wide range of cost for each type of craft.

What does it cost to operate a light airplane? Between \$9.516 an hour and \$12.81 an hour are the figures developed by Dr. Louis DeBru of the University of Illinois, after a look at costs for the last 11 months of 1948, on the 32 lightplanes operated by the university's Institute of Aviation as a fleet.

Analysis of operating costs showed:

- Costs of 16 Aeromac TAC Champion trainers (15 hp) ranged from \$4.516 to \$6.657 an hour.
- Three Boeing A7S (PT-15) trainers (210 hp.) showed costs of \$11.01, \$9.494 and \$9.093 an hour respectively.
- Two Cessna 120s had costs of \$4.975 and \$4.697 while two Cessna 140s had costs of \$5.187 and \$5.277.
- Two Cessnas, one new and one used, showed costs of \$5.115 for the new plane and \$6.49 for the new one.
- Three Beech Bonanzas, one Model 35, and two A-15s showed costs of \$11.737, \$4.364 and \$9.561 respectively.
- Four other makes of plane, one each, showed following hourly costs: Republic Seabee amphibian, (400 hp) \$15.78; Stearman Voyager 150, \$9.976; Piper SuperCruiser, \$5.573; Taylorcraft DC-6 (100 hp) \$5.270.

Depreciation Charge—Cost ranges between the planes is partly explained by the depreciation charge placed against each plane by the university.

Depreciation of \$4 a flight hour was charged against the Bonanza and the Republic, \$1 an hour against the Seabee and the Stearman, \$2 an hour against the Cessnas and SuperCruiser, and \$1 an hour against the Cessnas, Aeromacs, and Taylorcraft. The light plane depreciation basis is especially useful, Dr. DeBru says, as cases of greater than-average annual aircraft utilization. The university's planes are flown more than twice the national annual average. (Depreciation rate on the two Beech A-15s has recently been increased to \$5 a flight hour by the university due to increase in purchase price and introduction of additional radio equipment in planes.)

The university acts as a liaison of its aircraft except for property damage and public liability. Total expense of aviation to damaged aircraft added under this policy amounted to only 6 cents per flight hour, while 9 cents

per flight hour was allowed for liability insurance.

Fuel Allowance—Other fixed charges, the most for all planes, is \$1.50 an hour. Other charges include:

- Shop overhead maintenance (including salaries of maintenance engineers, shop foreman, mechanic, stock room clerk and secretary), and labor and material costs of repairing parts for labor use, \$1.14 an hour per plane.
- Depreciation on shop equipment (total depreciation is 10 yd. 10 cents a flight hour per month).
- Insurance—salaries, service insurance who give one third of time to transport aircraft and two thirds to university fleet: \$4 cents a flight hour per aircraft.

Fuel consumption averaged from 3.66 gal./hr. for the Taylorcraft out to 54.7 cents, to 17.3 gal./hr. for the Seabee, costing \$2.977 a total of 16, 598 hr. flown by the fleet consumed 75,653 gal. of fuel at a cost of \$14, 701.47 and 4211 gallons of oil at \$549.30.

Average direct maintenance cost per flight hour on airplanes of less than 100 hp. was \$1.74. Total fleet maintenance cost was \$14,739.71 for labor and \$13,073.71 for materials. One Beech Bonanza A-15 which was flown 177.5 hr. showed a total maintenance charge of only 76 cents, while the new Republic, which was flown 235.3 hr. had the highest maintenance cost, \$4.22 per hr.

Charges for material were at actual cost to the university and probably about 10 to 20 percent less than actual material prices, but Dr. DeBru estimates that this is probably balanced off by restrictions to keep the equipment as good as new, and where possible, beyond CAA equipment. Only experienced aircraft and aircraft engine mechanics were employed with a ratio of one mechanic to four aircraft. Labor costs averaged approximately \$1.31 per hr.

Fuel was all-attest aviation gasoline, purchased by the university at bid prices with an average saving of several cents a gallon over retail. Standard operating procedure for the fleet called for use at decreased throttle on takeoff and landing, and for a cruising speed 100 mph less than recommended by the engine manufacturer.

Completion of changes were made in each plane after 70 hours of flight with an average of about one hour added between changes.

Dr. DeBru points out that as valuable for general application is shown for his figures, and that the university's own cost figures have changed since the study was made. He notes the inclusion of larger cost in a cost new, which would be included under other circumstances. He also points out that the amount of flight time on some of the aircraft was so small that their costs were of questionable statistical value.

Value of the study is most principally as an systematic looking up of the current cost factors and in the wide variety of aircraft types studied, offering some basis for comparison for a large segment of today's aircraft operators with their own operating costs.

Airport Builds Lightplane Runway

Van Nuys (Calif.) Municipal Airport is constructing a separate taxiway strip for lightplanes as part of the field's development by the Los Angeles Department of Airports.

Strip will be 2000 ft. long, 75 ft. wide, and parallel to the north end of the main runway. Airport manager Cal. Clarence M. Young says the purpose of the new strip is to relieve congestion on the main runway during peak periods.

Cost of the new strip will amount to \$8776.18, according to Young. Other projects at the field, in addition to landings, include expansion and rehabilitation, include construction of a new air traffic control tower. Work will soon be started for this project.

Metropolitan Airport was taken over from Van Nuys Administration by the Dept. of Airports on Feb. 11, 1949.

N. Y. Airport Guide

Locations of 268 public airports in New York State and details of facilities are included in a 1949 map and directory recently issued.

Map underscores the extent of 251 communication airports, as national and shows location of airports in relation to county lines, principal waterways, cities and villages of 1000 or more population and smaller as marked communities.

Directory lists names of airport operators and managers, aircraft landing charges, fuel supply, available, maintenance facilities and wave length of radio control towers.

Copies of the map may be obtained free by writing New York State Department of Aeronautics, 113 State St., Albany, N. Y.

the British government," according to Ken.

The Missouri carrier claimed that the Belgian airline, Sabena, had received an (Misral) Plan Contra-Lesion costing about \$450,000 each. But, he added, "airlines running out of St. Louis, such as Chicago & Southern, apparently can't afford to replace their older equipment with Conquest."

Collision Ruins Best Safety Mark

The best safety record in the history of scheduled domestic air transportation slipped in July 30 when the industry ranked its first fatal accident in eleven months and close to six billion passengers a day.

Crash of an Eastern Air Lines DC-3 east Fort Day, N. J., resulted in the death of 12 passengers and three crew and closed the business. Last year's fatal mishap on the scheduled domestic airline involved a Northeast Airlines Douglas DC-2 which fell near Weston, Mass. Aug. 25, 1946, killing 17.

Records Compared. The 11-month period was not the longest loss by the scheduled domestic carrier without a fatality.

There were no domestic passenger or crew deaths for the 17-month period between May 27, 1939, and Aug. 31, 1940.

Even so, the recently terminated 11-month record is the most significant since it comes within 1 billion passengers (under one billion) of the 1,565,000,000 flown during the 1939-40 safety stretch.

Other safety accidents involved one of the most of last month during the EAL crash. U. S. overseas day lines had flown since Apr. 15, 1946, without a fatal mishap. Certified inspection had no fatal accidents since the first scheduled service was activated in August, 1945.

Navy Craft Wrecked. Preference rates indicated the Pan Am DC-3 crash was on that of Eastern. The DC-3, southbound from New York, was flying to a Navy Fleet Station plane flying from Washington, D. C., to Quantico Point, R. I.

Witnesses said that after leaving a major gate the Navy plane cleared sharply and struck the DC-3. The transport plunged to the ground, killing all aboard.

Another EAL plane and a National Airlines flight reported being headed by New South Wales Navy planes the same time. The Navy has established a special board of inquiry, and the Civil Aeronautics Board has begun its own investigation into the cause of the mishap.

How IATA Solves Airline Exchange

International airline cooperation pays off through this efficient handling of the carrier's currency exchange.

Expenditure of dollars in currency exchange between countries operated by its 35 airlines, the Institute of Air Transport (IATA) clearing house has become the indispensable link for all financial transactions in international air transport.

Exchange. IATA, established in the closing hours of 1947 in London, for the last month of 1947, currency turnover was \$720,000. At that time there were only 12 airline members. In September, 1948, the clearing house handled the peak figure of \$15,551,000. Total turnover for 1947, first year of operation, was \$25,480,000. In 1948 the figure more than doubled to \$124 million.

This year turnover is expected to top \$145 million, and by 1952, according to estimates, it should be at least \$205 million a year.

Before IATA established the clearing house, international airlines had to deal with each other in currency transactions. This was complicated by the many agreements and currency restrictions imposed by countries after the war. American carriers had an almost insurmountable task in recovering dollars in exchange for currency from countries with widely fluctuating values.

Now, members present their debts in their national currency to the clearing house, where the dollars are translated into dollars or pounds, depending on whether the member is in a sterling or dollar zone.

Economical Clearing. After a month of the debt is possible in cleared by effect, the result is settled in cash. In 1947, clearance was more than four times as often. In 1948, the average was less than twice. Sweden's ABA once had a \$1 million turnover settled by 20.75 percent of the bill and only 25 percent cash. With no clearing house to handle the transaction, it would have



Arthur Quin-Hack, first chairman of IATA.

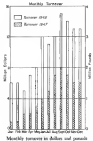
cost the carrier \$240 in exchange brokerage fees and involved the purchase and sale of about nine currencies.

Member Toll. Each member shares management charges in proportion to his use of the clearing house. These costs have been fixed in terms of 1 percent of the debit and credit turnover, or a percent of the way-way turnover of the clearing house. Members are charged 5.0 cents for every \$500 they put in the clearing house, but they are not charged on debts.

Cost of running the clearing house is estimated at \$30,000 per year, including \$18,000 for contribution of participating expenses.

Running the clearing house is the job of late Arthur Quin-Hack, for many years chief accountant of Imperial Airways and later chairman of the director of British Overseas Airways Corp. Initial headquarters was a single room in a hatched building in London's Portland Place. The unit consisted of Mr. Quin-Hack, a treasurer and an older clerk. Now the office is completely staffed and is located at 30 Cannon St., New York, London.

Cooperation Pays Off. Quin-Hack estimates airline members of the clearing house save themselves not less than \$28,000 per year in exchange brokerage fees. Sometimes the saving is much greater. When the French line was dissolved in 1948, creditors to whom French airlines owed about \$20 million, equivalent in sterling to dollars and not less than \$10 million, could have paid sterling or dollars at the pre-change rate. A clearing house agreement provides that all accounts payable to devel-



Monthly turnover in dollars and pounds

ment will be brought into clearance at the pre-devaluation rate of exchange.

In this case, 24 airlines were involved. The French airline, which had collected fares but was required to pay in other currencies, was owed \$65,000 by effect. Airlines which had accumulated fare credits after the effect was made were \$65,000 by being able to convert into dollars or pounds at the old rate. The saving to members was more than three times the annual cost of operating the clearing house.

Currently, time elapsed before settlement is 41 days, but 10 of these days are consumed by the airlines in sending in accounts. One airline has shown technical delays with Geneva 1948, although the company is still considering acquisition of French Airlines or Swiss National.

Costs Offset. IATA-Central, against the Geneva 1948, has funded, will carry a maximum of four passengers, a pilot and 200 lb. of baggage and mail. Costing about \$16,700, the plane will cruise at 146 mph.

Operating cost is estimated at 31 cents a plane mile, including direct flying costs of roughly 15 cents a mile. This is based on operation of two round trips daily over Central's five route airports and assumes an annual completion factor of 30 percent of all scheduled flights.

The Boston and Nova Scotia can be operated at a direct cost of 5 or 6 cents a mile less than the Geneva 1948 that they fly only once a week.

Cost Factor. CAB expects to generate a 75 percent load factor with the Geneva at a profitable loss of 5 cents a mile. This would make a total per load-carrier amount of about \$6 cents a plane-mile.

Central Plans Cessna 195 Service

One-engine feederline costs estimated at 31 cents per plane-mile. See 75 percent loads on tri-state route.

Freedom flexibility of single engine planes for feeder operations is being championed especially by Central Airlines, Glendale, Cal., which hopes to put its three into practice this summer.

Unable to raise sufficient money to activate its short-line system with large multi-engine transports, Central began clearing planes to open service with lightplanes when the Civil Aeronautics Board commenced the long delay for such operations. The company intends to start scheduled flights over two of its traditional routes separately in California, northern Texas and southern Kansas by the end of August.

CAB last last month approved interlocking discounts and charges in Central's control, thereby permitting the carrier to complete full arrangements for private use.

More Experience. Although CAB has promulgated new rules enabling feeder to use single-engine equipment for short-haul service in areas where topography is favorable, the Federal agency definitely regards the move as an experiment. If the lightplane service proves unacceptable to the public and does not meet the needs of the Post Office it can be terminated without loss because of the comparatively low costs involved.

Keith Kibbe, Central's vice president and general manager, has disclosed a tentative plan for operating his 1135 one-engine Cessna 195, although the company is still considering acquisition of French Airlines or Swiss National.

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Cost to the government would be \$255,000 annually on the basis of 15,000,000 miles flown. Total estimated capital investment required is \$23,213, including \$167,000 for 16 planes.

Central and that of CAB will permit night operations with single-engine equipment and allow routes available at 600 to 800-hr intervals and of local local origin can be obtained at five per cent of a \$70 monthly plus 10 percent commission. The total estimated total operating cost could go as low as 20 cents a plane mile. On the other hand, if these conditions do not materialize, costs could go as high as 35 to 40 cents a plane mile.

Fixed Fee. CAB-CAB officials note that while the use of local fixed fee operation is combination feeder again, lightplane operation and passenger experience may be less consistent, a conflict of interest between each agent and the airline is likely to exist because of the charter operation of the local operation. Kibbe replied that the assumption is that the local operation will be profitable because they can get considerable charter business to offset costs from Central's passengers.

Central admits there will be no lack of public acceptance of the single-engine plane in scheduled transportation over the use in general. It claims that the numerous charter flights by fixed fee operation at airports along the certificated feeder routes have already demonstrated the feasibility of the trading public with the convenience and safety of the lightplane.

Lightplane Advantages. One advantage for the lightplane is the fact that it can be maintained, repaired or be found at most of the airports along the route, where the fixed fee operators are thoroughly familiar with the equipment to be equipped.

Another advantage for the single-engine plane, according to Kibbe, is its high resale value as compared to the DC-3. He estimated that a CAB certificate for a Central's five route airports and assumes an annual completion factor of 30 percent of all scheduled flights.

The Boston and Nova Scotia can be operated at a direct cost of 5 or 6 cents a mile less than the Geneva 1948 that they fly only once a week.

Cost Factor. CAB expects to generate a 75 percent load factor with the Geneva at a profitable loss of 5 cents a mile. This would make a total per load-carrier amount of about \$6 cents a plane-mile.

The company will keep two planes in reserve for this purpose. It figures that

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LETTERS

Resort Graduates

I am sure that readers of *Resort Airlines* as new article under "Air Transport," July 11, was just one of those peculiar things that happen to be actually true, but have around the corner. "Resort Airlines," strongly suggest, so have had considerable adverse reaction from the public and certain stock holders of the Company. When you see the 40 experienced control and flight letters of reputation withdrawn and lost their original authority, not include *Resort Airlines*, the subject is very unfortunate.

Just to set the record straight, we would greatly appreciate it if you would publish a short clarification to the effect that *Resort Airlines* graduated from the airport field to the rate of the certified airlines. (Only if could not be held, and therefore *Resort* did not request a new letter of authorization.)

E. C. BOWEN, Jr., President,
Resort Airlines Inc.
161 Lexington Ave.
New York, N. Y.

(*Resort Airlines* was indeed the only "graduate" among the 40 unaffiliated carriers which actually had their authority to operate non-scheduled flights with complete equipment. As reported in *Aeromarine News*, June 20, the Civil Aeronautics Board on June 20 completed with President Truman's submission and awarded *Resort* a five-year certificate to conduct all-passenger service from U. S. ports to Mexico, the Caribbean area, South America and Canada. Still pending before CAB is *Resort's* request to operate various short air domestic routes.—Ed.)

Learn From Nonskeds

Please allow the letter to contribute you as now excellent editorial, "We Transport Should Grow Up," June 27, *Aeromarine News*.

We of *ANDCO* center in now thinking that *ATA* has been considerable gain the methods in economic and safe operation. The economy industry must take a lesson of every lesson learned, regardless of whether that lesson is not contributed from without the scheduled airline group.

WILLIAM J. KATZ, President & General Manager
American Air Export & Import Company
Miami Springs, Florida

Crash Fires

John and Carmichael Bessett are to be congratulated upon his excellent article, "How to Cut Crash Fire Danger," in *Aeromarine News*, June 20. It is a most constructive contribution.

ALLAN R. FENIMORE
Assistant Professor of Economics
University of Virginia
Richmond, Virginia

Air Marking

Your editorial on air marking July 11 gives a pessimistic picture. We feel that it is not being fair to our state. Last year we conducted full-scale marking and this year our contract is as the 5th working on a project that will result in approximately 800 more new markings, plus the re-marking of 40 old markings.

There are approximately 710 registered aircraft that can be marked in this state, so you can see that upon completion of this 1949 project not almost every airplane will be so marked. Not being marked with an adequate recognition and system, we have to rely almost entirely on the pilot's own judgment.

F. R. WEAVER, District Air Commander
Aeronautics Commission
State of Wisconsin
Madison 1, Wis.

From Tony Le Vier

The usually reliable *Aeromarine News* was most pretty far off the beam in its item, "Last Month's Bonus," printed on Page 1, June 13. The erroneous article has been a source of acute embarrassment to me and to Herman Saffron, and I should like to clear the situation in several ways.

I don't believe that Lockhead would ever sell under any circumstances, a percentage such as you described and I am sure you that neither Saffron nor I would ever take advantage of a firm's company in the way you suggested. The statement that Saffron and I occupy a special position among employees of Lockhead is particularly inappropriate and completely untrue. I am only an *Aeromarine News* and regret this incident. I trust you will understand the spirit of this correction.

TONY LE VIER
Lockhead Aircraft Corp.
Burbank, Calif.

(Upon receipt of the letter, *Aeromarine News* checked back with me and reported that the statement was in error. In the light of Mr. Le Vier's check, however, no action is being taken and we are sorry the issue was misapprehension.—Ed.)

SHORTLINES

► **AB Aeromarine**—Has reorganized service on the Buffalo-Pittsburgh line, last of its seven feeder routes to connect. A.A.A. CAR has been added to extend A.A.A.'s Washington-Albany City route to New York City. ► *Companys* new S-48 passenger in June and expected to fly 11,000 to 12,000 in July.

► *Aeromarine*—View 1,422,025 freight ton-miles in June, up 28 percent over the same month last year. June month volume was down 34 percent from last year, and export traffic dipped 7.5 percent.

► *Eastern*—Reports a net profit of \$2,194,361, in 58 cents a share, during the first six months of 1949, compared

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where any or all of the above information is an important factor.



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EDITORIAL

(Continued from page 48)

power range for which he is rated. Quite to the contrary, a commercial pilot, who takes his flight check in a two-engine airplane of low horsepower may carry passengers in an airplane the size of a Constellation at Douglas DC-6 without having been checked by a CAA inspector in an airplane of that size.

A contract carrier pilot may carry passengers if he holds a commercial pilot certificate (300 hours of flight time required) and holds an instrument rating. He need not be familiar with the aircraft model he operates.

The scheduled airline is required to provide a training program for its pilots, in order to maintain a high standard of pilot technique. This training program is particularly addressed to training in emergency-avoidance operations and in instrument approach procedures. The unscheduled operator is not required to establish such a training program. Each airline is required to provide enough check pilots to make certain that each pilot employed by the company meets the pilot requirements and receives the training and check flying required. Nonscheduled carriers are not required to employ check pilots.

Air America: Since June, the CAA has required that an airplane airline pilot (1) hold a current Air Transport Rating, (2) receive instrument competency check at intervals of six months, and (3) take his competency checks in the type of aircraft operated by his employing carrier. Upon successful fulfillment of these tests, the regular skipper is granted a "type" ATR, designating DC-3, DC-4, C-46, DC-6 or Constellation competence. He can fly only that type for which he has been currently licensed. Furthermore, the regulations provide that each airplane carrier "shall by means of a training program or otherwise assure that crew members are proficient in their duties and are kept currently informed of all technology and new developments pertinent thereto. The program shall include instruction in emergency procedures and in crew co-ordination." In the case of Air America, these required techniques have long been basic company mantras. Air America sets an ATR with 5000 hours as a minimum for captains and also requires that all pilots hold an ATR with 2500 hours. How many ATA members outreach this latter "insurance"?

Aircraft Maintenance

ATA: The certificated airlines are required by regulation to have a maintenance organization responsible for the continued airworthiness of their aircraft. All maintenance must be supervised by qualified mechanics, an adequate inspection organization must be maintained, a large quantity of spare parts must be available at all times, and a replacement parts program must be

followed. The certificated airlines are required to maintain a staff of ground personnel adequate for safe operation and a training program for such personnel. The regular and contract carriers are not required to have any ground personnel or to meet any of these other requirements. They are subject only to the general requirement that their airplanes be airworthy.

Air America: Certain carriers, whether scheduled or not, are subject to identical maintenance requirements specifying flight, 25-, 50-, and 100-hour inspections plus 100-hour engine overhaul and 5000-hour airframe overhaul. All carriers must maintain adequate records to demonstrate that all work specified in CAA-approved maintenance manuals has been performed. Moreover, all such work must be performed by a CAA-approved maintenance station. If Air America and other non-scheduled have found profit in 599 lines, it is only because ground personnel who sell out old carpets or build T-bone steaks—persons who are not required by any Civil Air Regulations—have been eliminated along with a number of vice presidents. Moreover, all maintenance for Air America is performed by the Oakland firm which (1) received Air Transport Magazine's award for superior maintenance two years running and (2) which has fulfilled maintenance contracts with the second largest scheduled airline in America.

Aircraft Dispatchers

ATA: No scheduled airline aircraft may depart without the approval of a dispatcher certificated by CAA. They must the pilots in drawing up the flight plans, supervise the loading of the aircraft, and continuously supply information to the pilots in the air. The irregular and contract operator is not required to maintain a dispatching organization.

Air America: How, again, the contract carrier conducts the line. Actually, Adm Land is absolutely correct in stating that non-scheduled are not required to maintain dispatchers. In practice, however, large airlines in which two or more certified airlines in the preparation of a city flight plan, assign the captain to pre-flight supervision of loading as determined by loading slips/notes furnished by the airline manufacturers, and rely in flight instructions whenever possible via telephone communication with local base operators who furnish ground services on the needed flight from California to New York. Air America has asked the local Air Line Dispatch Area, an AFL union, to hamish up with dispatchers at each normal station. The answer: Not accepted because a minimum of 12 flights a month through five cities hardly justifies the union's attention.

Other Differences

ATA: There are many other differences between the detailed safety regulations prescribed for the scheduled airlines and the much less restrictive standards with which the irregular and contract operators must comply. Only the outstanding differences have been noted here.



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 Fuel economy, 9½ gal. per hour

Compare these comfort features

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 Insulated, sound-proofed cabin
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